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## *Drabopsis* Is United with *Draba* (Brassicaceae)

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**ABSTRACT.** *Drabopsis nuda* is transferred to *Draba*, and the two genera are united. The distinguishing characters separating these two genera and *Arabidopsis* are discussed.

**Key words:** *Arabidopsis*, Brassicaceae, Cruciferae, *Draba*, *Drabopsis*.

The systematic position of *Drabopsis* K. Koch has been the source of continuous controversy. The genus has long been considered to be monotypic. Naqshi and Javied (1984) added another species, *D. brevisiliqua* Naqshi & Javied, that was said to differ from the highly variable *D. nuda* (Bélanger) Stapf by having shorter fruits (ca. 1.2 cm) and non-flexuous scapes. In our opinion, these differences are trivial and *D. brevisiliqua* is reduced to synonymy of *D. nuda* (see below).

*Drabopsis nuda* is distributed from western Xinjiang (China), central Asia, Kashmir, and Afghanistan westward into Iran, Iraq, Turkey, Caucasus, and Crete (Gustavsson, 1977). The nomenclature of the species has been dealt with by Léonard (1977), and the species should be recognized as *D. nuda*, instead of the later-published *D. verna* K. Koch, as was done by Cullen (1965), Hedge (1968), Jafri (1973), and Gustavsson (1977).

*Drabopsis nuda* does not fit appropriately in any genus. It was originally described as *Arabis* L., and it resembles *Arabis auriculata* Lamarck in having linear, somewhat latiseptate fruits, stout fruiting pedicels nearly as thick as fruit, and accumbent cotyledons. However, the species cannot be accommodated in *Arabis* because it has yellow flowers and leafless scapes. The presence in *D. nuda* of accumbent instead of incumbent cotyledons and leafless instead of leafy stems strongly supports its exclusion from *Sisymbrium* L., where it was placed by Boissier (1867).

Busch (1909) and Bornmüller (1911) transferred *Drabopsis verna* and *D. nuda* to *Arabidopsis* (DC.) Heynhold, respectively. No reasons were given to

support such transfer, and Jafri (1973) recommended that the two genera be united, though he maintained both. The lack in *Drabopsis nuda* of any cauline leaves and the presence of stout fruiting pedicels nearly as thick as the fruit, yellow flowers, and stalked, almost exclusively stellate trichomes clearly do not support its placement in *Arabidopsis*. All species of *Arabidopsis* have cauline leaves, fruiting pedicels narrower than fruits, white to lavender flowers, and a mixture of simple and forked trichomes. Furthermore, molecular data (O'Kane & Al-Shehbaz, in prep.) demonstrate that *Arabidopsis* and *Drabopsis* are unrelated. Al-Shehbaz et al. (1999) excluded the species from *Arabidopsis* but maintained it in *Drabopsis*.

The recognition of *Drabopsis* as a monotypic genus does not solve its affinity and relationship. In every aspect of its scapose habit, leafless scapes, annual duration, flower color, accumbent cotyledons, and trichome morphology, *Drabopsis nuda* is more at home in *Draba*. In fact, Boissier (1867) was the first to point out the resemblance of the species to *Draba* L. (as *Erophila* DC.). The only morphological oddity brought about by the placement of *Drabopsis nuda* in *Draba* is the relative length/width ratio of the fruit. No other species in *Draba* has fruits as many as 45 times longer than broad, though this extreme length/width ratio of the fruits in *Drabopsis nuda* is the maximum, and according to Zhou et al. (2001), the species has fruits (10–) 17–33(–45) × 0.8–1 mm. Other species of *Draba* with linear fruits as long as 30 times the width are found in the Himalayan and central Asian *D. aucheri* Boissier and the Tibetan *D. nylamensis* Al-Shehbaz (Al-Shehbaz, 2002).

Schulz (1936) placed *Drabopsis* in the tribe Arabideae and *Draba* in the tribe Drabeae. His tribal assignment of the two genera is not supported by morphological or molecular data, and it has been shown that the closest relatives of *Draba* s.l. are

Eurasian *Arabis* and *Aubrieta* Adanson (Koch & Al-Shehbaz, 2002).

Molecular studies (Koch & Al-Shehbaz, unpublished) clearly show that *Drabopsis nuda* is close to the annual species of *Draba* (e.g., *D. nemorosa* L., *D. muralis* L., *D. verna* L.). Phylogenetic analysis using DNA sequence variation of the internal transcribed spacers ITS-1 and ITS-2 of nuclear ribosomal DNA demonstrated that *Draba* (including *Erophila*) forms a monophyletic assemblage. The vast majority of perennial species of *Draba* are combined to one large group, and all annual taxa, including *Drabopsis nuda*, are positioned basal to them.

***Draba nuda*** (Bélanger) Al-Shehbaz & M. Koch, comb. nov. Basionym: *Arabis nuda* Bélanger, Voy. Indes Or., Bot. t. 15a. 1834. TYPE: illustration t. 15a.

*Drabopsis brevisiliqua* Naqshi & Javied, J. Econ. Tax. Bot. 5: 966. 1984. Syn. nov. TYPE: Kashmir. Harwan, A. R. Naqshi 3784 (KASH).

*Draba nuda* is easily distinguished from all of the other annual, yellow-flowered species of *Draba* by having leafless scapes, stout fruiting pedicels nearly as thick as the fruit, slightly flexuous rachis, and slightly compressed, slender, linear fruits (1–) 1.7–3.3(–4.5) cm × 0.8–1.2(–1.6) mm.

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